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Systematic approach to the designing management objects: from concept to organisational structure

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Abstract: The purpose of the article is to substantiate a systematic approach to the design of management objects implemented according to the scheme: 'external environment → concept → management object → function (business process) → enterprise divisions (business system) → organisational management structure'. The sequence of basic concepts of objects management in business, such as management, marketing and logistics are substantiated. The main management objects of these concepts are identified and the relations between them are established. The definitions of interrelated terms 'management', 'marketing', 'logistics', 'business systems (chain) management' and 'value management' are proposed. Main business processes performed within the framework of basic management concepts and the divisions of business system links (chains) responsible for their implementation are identified. The recommendations on the formation of organisational structure of management of links of these business systems (chains) have been developed.

Keywords: concept; management object; management; marketing; logistics; business system; business process; enterprise; division; organisational structure.

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1 Introduction

An achievement of any management goal depends on the degree of formalisation, structuring and detailing of management decisions, including a number of professional terms characterising the essence and content of a particular management concept. These terms, in particular, include the terms 'management', 'marketing', 'logistics', 'chain management', 'value management', etc., which appeared at different times and were in demand at various stages of business development.

The emergence of certain terms that reveal the essence and characterise the content of management concepts is predetermined by a unique combination of factors of the external and internal environment of enterprises, formed in accordance with the laws of business development. These patterns not only determine the content and mechanism for implementing these concepts in practice, but also provoke their transformation, which is carried out either abruptly: when replacing one concept with another, or evolutionarily: within the framework of the management concept used.

Identification of patterns of business development based on the study of factors of the external and internal environment of enterprises makes it possible to identify key objects that can be influenced by the management entity, and which are priority for it at a particular moment in time. Moreover, these objects can be identified by measuring their quantitative parameters and qualitative characteristics using a particular scale; assume their clear formulation; represent the system or set of objects with stable links, which can also be measured and/or described; and also create prerequisites for identifying the management concept or a certain phase of its development and, accordingly, justifying the content of terms reflecting the essence of these concepts.

Despite the simplicity of the above sequence, its use in practice requires a decision of many chronic problems in the fields: management (Hitt et al., 2012; Engwall et al., 2016; Kaehler and Grunde, 2019), marketing (Wilkie and Moore, 2007; Brunswick, 2014; Contreras and Ramos, 2016), logistics (Farahani et al., 2011; Kukovič et al., 2014; Rushton et al., 2014), supply chain management (Stock and Boyer, 2009; Naslund and Williamson, 2010; Janvier-James, 2012), value management (Lancaster, 1975; Porter, 1985; Woodruff, 1997).

An unambiguous solution to these problems is hardly possible. However, for a number of reasons, it is necessary to justify the approach to their decision. Such reasons are:

1 Reducing the 'bullwhip effect', but not in chains of various types, but in management terminology, since the errors of derived management terms begin to increase when trying to use basic management terms far from ideal for their creation, for example, 'management → chain management → supply chain management → sustainable supply chain management → social sustainable supply chain management', etc.

2 The relevance of digitalisation of management, in particular, the creation of its digital twins, which imply an unambiguous interpretation of management objects: enterprises, relationships, processes and flows, as well as their combinations, described mainly by qualitative characteristics.

3 Achievement of additional synergistic effect as a result of more correct formalisation, structuring and detailing of management decisions on horizons and vertical management of enterprises as links of chains of various types.

The objectives of this study are substation the sequence of basic concepts of object management in business; definition of the objects of these management concepts, as well as the relationship between them; formation of interrelated definitions of terms 'management', 'marketing', 'logistics', 'chain management' and 'value management'; identification of the main business processes carried out within basic management concepts, as well as chain link divisions responsible for their implementation; and finally, the development of recommendations for the formation of an organisational structure for managing the links of these chains. As follows from the list of research tasks, the basic approach to solving them is a system approach implemented according to the scheme: 'external environment → concept → management object → function (business process) → enterprise subdivision (business system) → organisational management structure'.

2 Literature review

The choice and use of basic concepts of objects management are largely determined by the essence and content of stages of economic development, which are interpreted differently in literary sources. For example, Rostow (1960) substantiated "five stages of development: the traditional society, the pre-conditions of take-off, the take-off, the drive to maturity, and the age of mass consumption", the basis of which is capital accumulation. Despite the validity of this point of view, in further studies, economists emphasised the importance of cultural, political, social, institutional and geographical factors for creating the right conditions for economic development (Hunter, 2012). This means that among the many factors that determine the economic development, it is possible to identify relevant factors that are crucial for the formation and development of management objects, and irrelevant factors that will either become relevant in the future, or will give these objects some differences, characterising their evolutionary development. As the example, it is possible to name other stages of economic development and, accordingly, management objects, such as:

1 A digesting surplus labour and catching-up process of technology (Gong, 2016). Obviously, these stages are focused on two management objects, such as 'labour' or 'personnel' and 'technology'.

2 Industrial revolution, production, marketing, post-industrial or post-modern era (Ansoff, 1965). It is difficult to distinguish management objects in the content of these stages, however, they focus on certain type of enterprise environment: the internal environment for production, the external environment for marketing, and at the same time the internal and external environment for the post-industrial era, etc.

The point of view of I. Ansoff is fruitful for achieving the purpose of this research, since allows proceed to the substantiation of enterprise management concepts depending on particular stage of economic development. This premise is consistent with the point of view that operational management includes logistics, marketing and production (Mentzer et al., 2008), which in turn forms the supply chain management map. If combine this point of view with the point of view of I. Ansoff, it is possible form the following

sequence of enterprise management concepts: 'production → marketing → logistics → (possibly) supply chain management'. It should be noted that production is a type of enterprise activity and is not the management concept. Therefore, in the future, the term 'production' will be replaced by the term 'management' (e.g., Kaehler and Grunde, 2019).

Each of the concepts presented above:

1 Represent 'idea, theory, etc. about a particular subject' (Concept, https://dictionary.cambridge.org/dictionary/english/concept). The idea of management is the effective use of human resources. The idea of marketing is based on the priority of the needs or values of end consumer of products and (or) services. The idea of logistics focuses the managers on managing not inventory, but resources flow.

2 Changes under the influence of external and internal factors. For example, researchers distinguish different variants: management schools (e.g., Koontz, 1988; Cheng, 1993); marketing concepts (e.g., Kotler and Keller, 2012; Takwi, 2012); stages of logistics development (e.g., Ballou, 2007; Rushton et al., 2014).

3 Focused on specific management objects, ordered both horizontally and vertically. For example, such objects for management can be: internal variables, such as purposes, structure, tasks, technologies and people (Mescon et al., 1988); for marketing the 'four Ps variables': product, price, place and promotion (McCarthy, 1964); for logistics: 'layperson's definition of logistics (the seven Rs)' (Shapiro and Heskett, 1985).

The objects of management, marketing and logistics described above are the basis for substantiation:

1 The content of the basic definitions of their terms. However, the research results of this aspect of management terminology have shown that there is practically no unambiguous connection between objects and terms of management concepts. As the example, it is possible com-pare the well-known terms 'supply chain management' and 'logistics' in the version of CSCMP (2013) (Table 1), taking into account that most specialists consider logistics to be intermediate stage for creating supply chain management (Coyle et al., 1996; Mejza and Wisner, 2001; Ross, 2003; Ballou, 2007; Mentzer et al., 2008).

   The analysis of the information in Table 1 allows determine the following features of the transformation of term 'logistics' into term 'supply chain management':

   a the recognition that supply chain management is not only 'management', but something more: 'planning and management'

   b the acceptance that logistics is the process and supply chain management is the integrated function, i.e., something less than logistics

   c the preservation of the 'planning' function in the term 'supply chain management' and the pre-formation of the 'implementing, and controlling' functions in 'management' while ignoring the functions proposed, for example, Fayol (1916)

   d the transformation of logistics into logistics management and its inclusion together with marketing in integrated function

e the replacing (information) technology with the function, although these are different terms

f the disregard of management, marketing and logistics objects, etc.

The above features confirm the incorrectness of the essence and content of terms 'supply chain management' and 'logistics' in the version of CSCMP (2013).

2 The management functions and processes, and in the first approximation, the functions are performed by the heads of enterprises, and the processes are carried out by executors who create value for the end consumers of products and (or) services. For the first time, the main management functions were proposed by Fayol (1916), and later their list was supplemented and clarified (e.g., Gullik, 1935; Borade and Bansod, 2007; etc.). The most popular processes performed by enterprises and chains include business processes based on Taylor (1911), Deming (1994), Cooper et al. (1997), Chang (2006), Smart et al. (2009), etc. However, in the studies of these and other specialists, there is no clear connections between the objects of different management concepts and different versions of business processes. Thus, the systematic approach to the design of business systems and business processes of various types used at various stages of economic development is ignored.

It is logical to assume that the functions and management processes should be performed by the enterprise divisions formed on basis of its organisational structure.

Table 1 The content of the terms 'supply chain management' and 'logistics'

Terms in the version of CSCMP (2013)	
Supply chain management ←	*Logistics*
… the planning and management of all activities related to sourcing, transformation, and all logistics management activities. Importantly, it also includes coordination and collaboration with reseller partners, who can be providers, intermediaries, third-party service providers, and customers. Essentially, supply chain management involves supply and demand management both within and between companies. supply chain management is an integrated function with primary responsibility for consolidating core business functions and business processes within and between companies into a holistic and high-performance business model. It includes all of the logistics management activities listed above, as well as production operations, and coordinates processes and operations with marketing, sales, product engineering, finance and information technology.	The process of planning, implementing and monitoring procedures for efficient and efficient transportation and storage of goods, including services, and relevant information from point of origin to point of consumption in order to meet customer requirements. This definition includes incoming, outgoing, internal, and external movements.

The above aspects form a logically linked sequence of stages that make it possible to understand the essence of the peculiarities of the formation of modern management. At the same time, it is necessary to determine the trends in its development in order to have in stock the most appropriate strategies for the behaviour of enterprises operating in different types of chains in the external environment. Solving this problem is difficult, since "we have seen … a lack of unity and understanding … research goals, growing confusion about what makes a logistics and supply chain management contribution, and even false assumptions that a profit/cost motive is always appropriate or even measurable" (Richey et al., 2022). However, many problems of modern management can

be successfully solved through "the management practices that driven from the traditionalists and human relations school of thought" (Hussain et al., 2019). Key management trends include:

1 The study of "hedonic, social, cognitive and functional motivational elements underlying consumer behaviour and innovation" (Seyed Esfahani and Reynolds, 2021).

2 "Understand, analyze, model and assume complex and dynamic business processes" of enterprise and chain management (Ammirato et al., 2022).

3 Development and implementation of disruptive technologies (DTs), on the one hand, provoking the emergence of numerous barriers, such as, for example, regulatory framework, infrastructure and resistance to change (Rathore et al., 2022), and, on the other hand, involving optimisation of "the relationships between mature and emerging information technologies, the lean and agile supply chain strategies" (de Oliveira-Dias et al., 2022). As part of this trend, the study of "perspectives to integrated digital project-driven supply chains with a purpose of end customer value addition" (Bhattacharya and Chatterjee, 2022), as well as "the application of digital twins to optimize supply chain management functions" (Bhandal et al., 2022).

4 Increasing the role of human resources in the management of different types of chains (Klumpp and Ruiner, 2022), as well as accounting for the relationships between political actions and supply chain strategy (Cantor et al., 2022).

5 Developing competitive advantages of enterprises in various types of chains (Hofer et al., 2022), as well as organising interaction between local supply chains under the leadership of "micro, small and medium enterprises (MSME) and global supply chains under the leadership of multinational enterprises (MNE)" (Rosca et al., 2019).

6 To achieve a "trade-off between sustainability capabilities and practices related to redundancy, flexibility and collaboration caused by different configurations of production system characteristics" (Dittfeld et al., 2022).

The above trends create the prerequisites for further improvement and development of the theory and methodology of modern management.

Thus, the analysis of literary sources revealed the number of the following questions of this study:

RQ1 How to substantiate the sequence of implementation of the basic concepts of enterprise management at various stages of economic development?

RQ2 How to define the main management objects when implementing the concepts of management, marketing, logistics and, possibly, supply chain management?

RQ3 Where do chain management and value management take place in the implementation of core enterprise management concepts?

RQ4 What business processes are necessary for effective management of enterprises and chains?

RQ5 How to form business units performing management functions and business processes?

3 Methodology

The selection and refinement of the study methodology is based on the following prerequisites:

1 Management objects and components shall be described by quantitative parameters and qualitative characteristics and measured by numbers and at least dichotomies, respectively.

2 To identify and substantiate the qualitative characteristics of management objects and components, as well as their dichotomies, it is advisable to use a descriptor research method based on the analysis of literary sources and/or sociological surveys of specialists at a particular time.

3 For structuring and formalising objects, as well as classifying management components, it is supposed to use a faceted research method, in which binary matrices are formed to obtain '2^x' variants of these objects (Bailey, 1994), where the number '2' reflects the number of dichotomies and x – the number of qualitative attributes of an object or component.

4 Binary matrices allow you to develop a classification of variants of objects and components and assign them binary codes consisting of the symbols '0' and '1' within the framework of such a research method as analysis. These variants are the basis for forming more complex combinations of an object or component using the synthesis method. Any binary matrix-derived combination of object or component variants is processed based on deduction and induction methods.

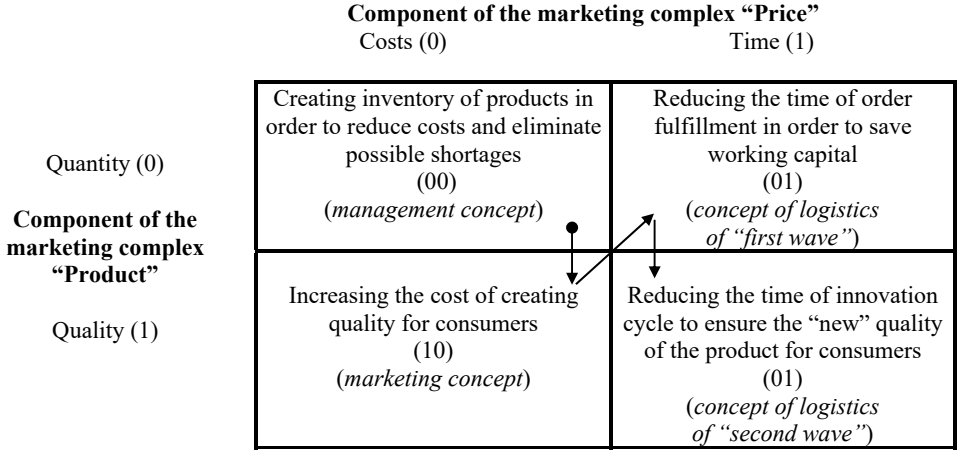
The use of binary codes in the conduct of research ensures the completeness of a systematic approach to the design of the terms 'logistics', 'chain management' and 'value management' and creates the prerequisites for predicting their essence and content in the future.

4 Results

4.1 Substantiation of the sequence of implementation of the basic concepts of enterprise management at various stages of economic development

It is possible to determine the basic concepts of enterprise management using two components of the Ps marketing complex: 'product', 'price' and four components 'layperson's definition of logistics (the seven Rs)': 'quantity', 'quality', 'cost' and 'time'. The components 'product' and 'price' are described by qualitative characteristics. Each of the characteristics has dichotomies, respectively, 'quantity', symbol '0', and 'quality', symbol '1', as well as 'costs', symbol '0', and 'time', symbol '1'. In other words, the product is measured in quantity and characterised by quality, and the enterprise profit is achieved either by reducing costs or the time for the production and sale of the product and (or) service with the increase in its price. The combined use of these characteristics and dichotomies allows substantiate four concepts of enterprise management: management, marketing and logistics of the 'first and second waves' (Figure 1).

Figure 1 Classification of the main management decisions and concepts of enterprise management



The information analysis in Figure 1 allows make the following conclusions:

1 These enterprise management concepts are implemented according to the following scheme: management → marketing → logistics of 'first wave' → logistics of 'second wave'. The point of view that logistics is the basis for formation of the concept of supply chain management is questionable, since flow management initially presupposes the use of the main objects of supply chain management: enterprises (Coyle et al., 2013), relationships (Christopher, 2011), and processes (Wisner et al., 2012). It is extremely difficult to imagine that the flow does not have initial, intermediate and final points (enterprises); the flow moves without prior approval of its parameters and characteristics by these enterprises, that is, without relationships between them; flow management does not provide for the execution of processes, and the end consumer is not interested in the flows of products and (or) services he needs and it is extremely important for him to know which enterprises in which relationships perform some processes. Therefore, it is not for nothing that supply chain management is subjected to well-founded criticism (Vollmann et al., 2000; Rainbird, 2004; Jüttner et al., 2007; Madhani, 2013). According to the author, it should be agreed that "whereas logistics is the difference of movement/not-movement, SCM is the difference of integration/disintegration. Therefore, logistics and SCM ought to be two distinct areas of study, even though they are structurally coupled to each other" (Georgi and Kaiser, 2009).

2 For each management decision presented in Figure 1, the corresponding principles of enterprise or chain management can be proposed: 'creating inventory of products in order to reduce costs and eliminate possible shortages', code '00' → principles of Fayol (1916); 'increasing the cost of creating quality for consumers', code '10' → principles of Deming (1994); 'reducing the time of order fulfilment in order to save working capital', code '01' → principles of Liker (2004); 'reducing the time of the innovation cycle to ensure the 'new' quality of the product for consumers', code '11' → 'mega trends that change logistics supply chains' (Bowersox et al., 2000).

3 The management decision, code ‘00’, is due to: the possibility of using trade discounts for the purchase of large number of raw materials, semi-finished products and components; the separation of conditionally fixed costs for larger volume of products (scale effect); rational use of technological equipment without its replacement (excluding losses in the volume of output due to readjustment equipment); reducing the cost of ‘lost profits’ due to possible shortage of raw materials, semi-finished products and components; relatively low effective demand for finished products and services, which makes it possible to effectively meet the homogeneous market needs. It is possible argue that this variant of the management decision is characteristic of such the concept of enterprise management as management;

4 The management decision, code ‘10’, is effective for the following reasons: the reorientation of customers to non-price parameters of the choice of products and (or) services, when the focus is not on the low price, but its consumer properties; the increase in the cost of ensuring the quality of products and (or) services in connection with the appearance of their modifications, which leads to additional equipment changeovers and to the loss of output of products (or) services; increased costs for additional technological operations and quality management of products (or) services; the increase in the costs of marketing research and development of the marketing complex in market of heterogeneous needs. It is possible argue that this variant of the management decision is characteristic of such the concept of enterprise management as marketing;

5 The management decision, code ‘01’, is effective for the following reasons: the transition of enterprises to the manufacturing of diversified range of products (or) services, in connection with which the possibilities of synchronising operations of technological processes and reducing the cost of products (or) services are practically exhausted; the need to improve management at enterprises and in chains in conditions of tightening competition in various types of markets; the possibility of reducing the need for working capital and increasing the profitability of the enterprise’s assets on this basis; the increasing role of logistics management methods aimed at eliminating cross-functional barriers. It is possible argue that this variant of the management decision is characteristic of such the concept of enterprise management as logistics at the level of the focus enterprise; or logistics ‘of first wave’.

6 The management decision, code ‘11’, is effective for the following reasons: the organisation of the flow of single products allows for minimum dimensional tolerances during their manufacture, which improves the quality of finished product consisting of these products; the elimination of cross-functional barriers at the chain level allows significantly reducing the duration of production preparation of innovative products (or) services; the reducing the duration of the innovation cycle makes it possible to identify areas for improving enterprise management, since in this case the risk of ‘lost profit’ losses increases significantly, which is eliminated by improving the management quality in chains, and also leads to the transfer of work part to outsourcing, i.e., to those enterprises that can perform the work assigned to them more efficiently. It is possible argue that this variant of the management

decision is characteristic of such the concept of enterprise management as logistics at the level of value chains focused on value creation or logistics 'of second wave'.

Enterprise management concepts are implemented in various business systems, the classification of which is shown in Figure 2.

Figure 2 Main types of business systems

Stability of parameters and characteristics of resource flows	**Type of resource flow movement**	
	Consistent	Parallel
Stable	Channel	Front
Unstable	Chain	Echelon

Source: Tyapukhin (2012)

It is necessary to emphasise that the management concept is implemented at specific enterprise or the link in the business system. The marketing concept considers the enterprise and its consumers as main management object, that is, as the channel of 'enterprise – consumer' type or the front for the selling products and (or) services of 'enterprise – many consumers' type. The concept of logistics 'of first wave' extends to business systems that include: two channels of type 'supplier – enterprise' and 'enterprise – consumer' (the three-link chain) or two fronts: providing the enterprise with resources and selling products and (or) services. At same time, regardless of the type of business system, this enterprise is focal enterprise in them (e.g., Parast and Oke, 2022). And finally, the concept of logistics 'of second wave' is aimed at managing echelons providing the enterprise with resources and selling products and (or) services), in which the focus enterprise is any enterprise that creates value for the end consumer and implements the concept of logistics 'of first the wave'. It is necessary to agree that the management of business systems of 'chain' or 'echelon' type is impossible if there is only one focus enterprise. At each stage and at specific time of managing business systems (and not just chains), within concept of logistics 'of second wave', another focus enterprise implements of concept of logistics 'of first wave', adding or not adding value to the resources at the entrance. At same time, it is possible to simultaneously operate several focus enterprises, between which relationships have not been established, which, as a rule, are opportunistic.

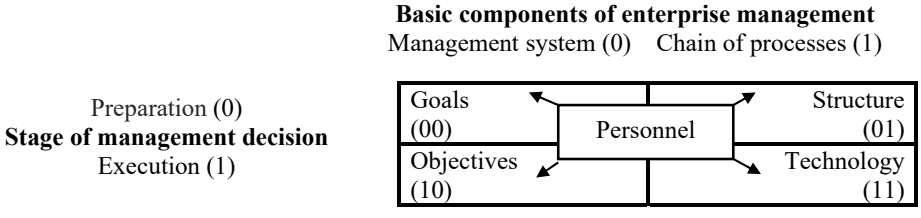
The concepts of enterprise management presented in Figure 1 provide for impacts on specific management objects.

4.2 Substantiation of the main objects of management in the implementation of management, marketing and logistics concepts

Previously, basic management objects were presented, such as internal variables, four Ps variables, and 'layperson's definition of logistics (the seven Rs)'. These objects must be objectively substantiated both in quantity and quality. Since almost each of them is described by qualitative characteristics and dichotomies, the decision of this problem involves their choice and joint use.

For example, to substantiate the management objects (internal variables) of management, it is advisable to choose the personnel of the enterprise as main object of management and use the following classification characteristics and dichotomies: 'basic components of enterprise management': the management system, symbol '0', and the chain of value creation processes, symbol '1', as well as the 'stage of management decision': preparation, symbol '0', and execution, symbol '1' (Figure 3).

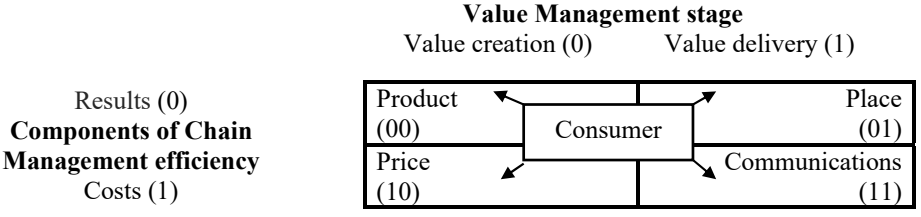
Figure 3 Classification of management objects (internal variables) of management



The management objects (internal variables) shown in Figure 3 allow create the following definition: 'management is the concept of influencing *personnel* formed on the basis of *organisational structure* and performing certain *technologies* in accordance with the *goals* and *objectives* of this enterprise'.

To substantiate the marketing objects or four Ps variables, it is advisable to choose the consumer of products and (or) the service as main management object and use the following classification characteristics and dichotomies: 'value management stage': value creation, symbol '0', and value delivery, symbol '1', and also the 'components of chain management efficiency': results, symbol '0', and costs, symbol '1' (Figure 4).

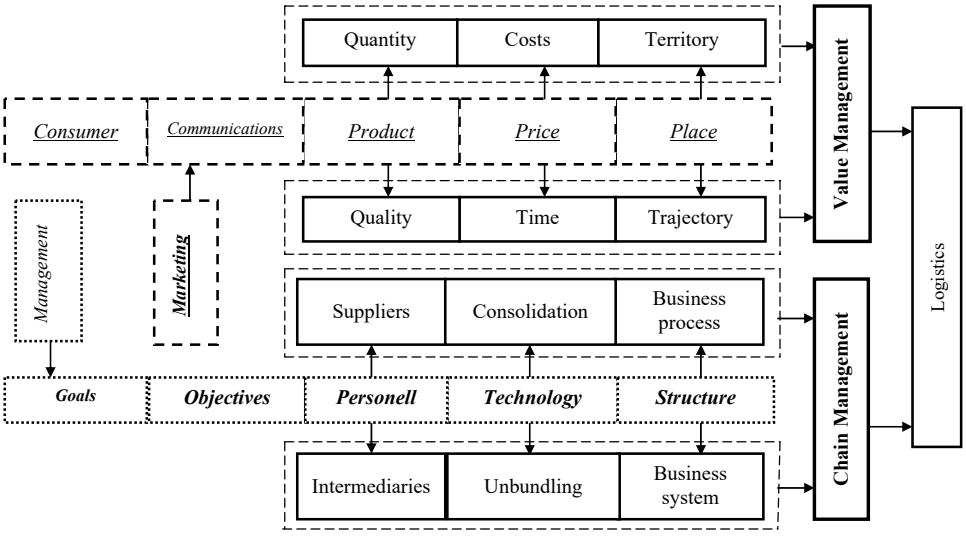
Figure 4 Classification of management objects (four Ps variables) of marketing



The marketing objects (four Ps variables) shown in Figure 4 allow create the following definition: 'marketing is the concept of managing *communications* with the *consumer*, focused on creating the *product*, selling it at agreed *price*, as well as delivering this product to specified *place*'. It should be noted that Figure 4 shows the management object 'communications' instead of the generally accepted object 'promotion'. The explanation of the need for this replacement will be provided below.

The content of Figures 3 and 4 allows substantiate the management objects not only of logistics, but also of chain management, as well as value management (Figure 5).

Figure 5 Classification of value management, chain management and logistics objects



Source: Tyapukhin (2012)

The content of Figure 5 allows make the following conclusions:

1 If previously the goal of marketing was to satisfy 'the needs and wants of specific target markets' (Schiffman and Kanuk, 1994), now it is focused on 'creating, communicating, delivering, and exchanging offerings that have value for customers' (AMA, 2017). Changing the marketing concept requires clarification and addition of its management objects. In this regard, it is necessary to recall 'layperson's definition of logistics (the seven Rs)', which includes two from 'four Ps variables' of complex marketing: 'product', 'place', as well as 'consumer' (Figure 4) and, as mentioned earlier, four more 'variables': 'quantity', 'quality', 'costs' and 'time'. Figure 1 shows the relations between these variables. Figure 5 shows that in any variant of the marketing concept, its main objects are 'consumer' and 'communications'. At same time, the variable 'product' can be structured into 'quantity' and 'quality' components, and variable 'price' into 'costs' and 'time' components. It seems appropriate to supplement the essence of variable 'place' with two variables: 'territory' and 'trajectory'. If, in marketing theory, the place is understood as the space occupied by specific consumer or consumers, then the territory is meant as the space that the consumer or consumers can occupy. Moreover, this space may be the space of marketing interests of particular supplier. Leaving one space, the consumer goes over in the space that is in the sphere of interests of another supplier. In turn, the 'trajectory' is a 'pipeline' through which products and (or) services from the supplier are delivered to the consumer.

   Thus, six management objects are formed in addition to the 'four Ps variables' of marketing and the object 'consumer'. These six objects allow obtain the following definition: 'value management is the variant of the marketing concept, which is associated with the effects of the management subject on resources and the *trajectory* of their flows in order to create value for consumers located in certain *territory* who have ordered certain *quantity* of products and (or) services of certain *quality* in for

certain period of *time* and those who agree to compensate for the *costs* of supplier that are associated with the design, creation and delivery of these products and (or) services.

2 In turn, the orientation of enterprises to the end consumers value of products and (or) services, as well as the shift in emphasis on the management of linearly ordered enterprises, provokes clarification and addition of the objects of management concept (Figure 3). In order to form, for example, the five-link chain included in supply chain operations reference model (Supply Chain Council, 2012), it is necessary to add the intermediary (supplier) and the supplier of this intermediary, as well as the intermediary (consumer) and the consumer of this consumer to the personnel of enterprise. In the conditions of increasing outsourcing efficiency, it becomes profitable for enterprises to transfer part of the technologies (technological processes) to third-party organisations (suppliers and intermediaries). In this case, the management object 'technology' is supplemented by two new objects 'consolidation' (or 'procurement') and 'unbundling' (or 'supply'). Such management object as the 'structure' extends to static objects, which are 'business systems' (Figure 2), and to dynamic objects, which are 'business processes'. It is noteworthy that there are two types of business processes: oriented to work 'in batches and queues' (e.g., Xia et al., 2002) and oriented to work with the flow of single products (e.g., Womack and Jones, 1996). The first type of business processes is performed within the framework of management and partly marketing (Figure 3). The second type is characteristic of logistics concept 'of first and second waves'. As follows from the contents of Figure 5, such management objects as 'goals' and 'objectives' do not change when changing one version of the management concept to another.

   Thus, six management objects are formed in addition to the 'internal variables' of management and the object 'personnel'. These six objects allow obtain the following definition: '*business system (chain) management* is the variant of management concept, which is associated with the effects of the management subject on linearly ordered links of the *business system* (*suppliers* and *intermediaries*) and *business processes* (technologies, *consolidation* and *unbundling* of resources, as well as products and (or) services) when creating values for their consumers'.

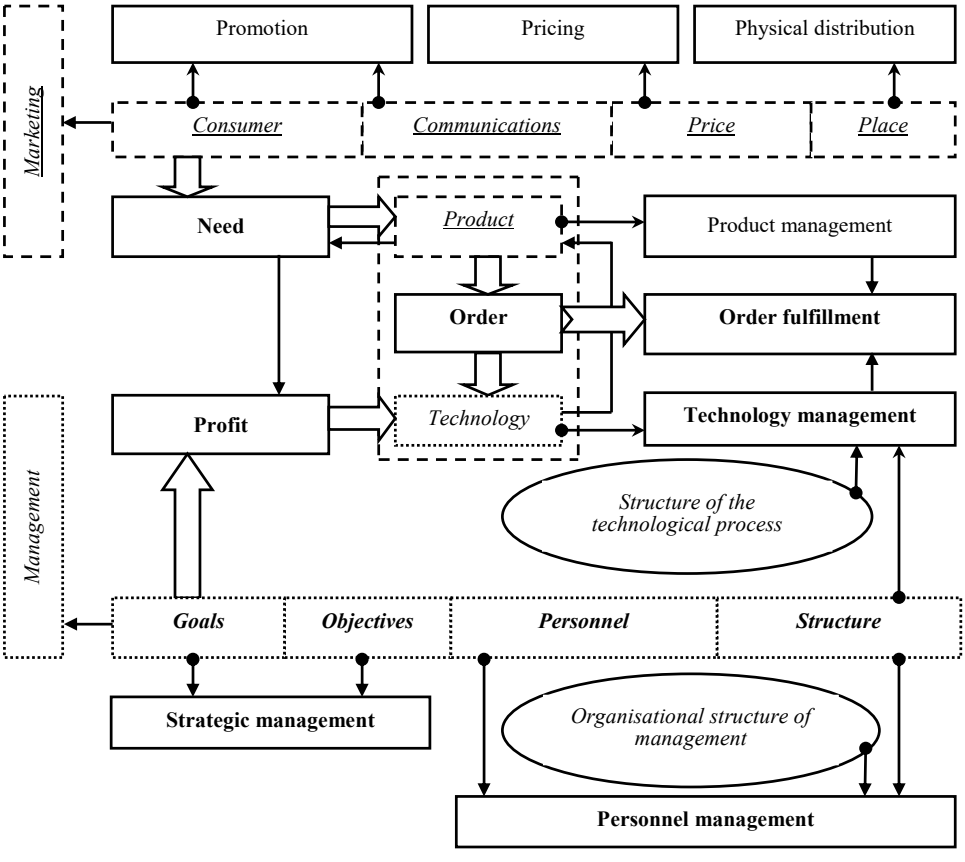
3 The above definitions of the terms 'value management' and 'chain management' are the basis for the formation of term '*logistics*', which is understood as 'the management concept that is associated with the effects of the management subject on resource *flows* moving along certain *trajectories* with the help of *business system* links (*suppliers* and *intermediaries*) that perform *consolidation* and the *unbundling* of these flows objects in order to provide end consumers located in certain *territory*, values within the parameters of *quantity* and *quality* of products and (or) services declared by them and agreed parameters of *time* and *costs* for their manufacturing and sale'.

As it is possible to see from this definition, the author, contrary to the point of view of most experts, claims that CHAIN MANAGEMENT AND VALUE MANAGEMENT are PARTS of LOGISTICS as the FLOW management concept, as well as 12 objects of chain management and value management (Figure 5).

4.3 Determination of business processes necessary for effective management of enterprises and chains

The management objects presented in Figure 5 make it possible to determine main business processes of management concepts and variants derived from them, developed and implemented as they are used, that is, when implementing the management concept, management business processes are used, which remain relevant during the transition to the marketing concept, at the same time, business processes of this concept are added to them. If the logistics concept is the priority for the enterprise, then new business processes are added to these business processes, as well as the essence and content of business processes of management and marketing are clarified. The main business processes of management and marketing as management concepts are presented in Figure 6.

Figure 6 ain business processes of management and marketing as management concepts



Source: Tyapukhin (2012)

The contents analysis of the Figure 6 allows make the following conclusions:

1 Such objects of the management concept as ‘goals’ and ‘objectives’ (Figure 3) create prerequisites for the development and implementation of the ‘strategic management’

business process. The management object 'personnel' serves as the basis for the formation and use of the business process 'personnel management'. The management object 'technology' determines the creation of the business process 'technology management'. And finally, the management object 'structure', in addition to focusing on the management objects 'business process' and 'business system', allows form the organisational management structure and the structure of technological process. Thus, main business processes of the management concept are the business processes 'strategic management', 'personnel management' and 'technology management'. The rest of the business processes are related to certain time and serve as the basis for the emergence of variants of the management concept, such as quality management or innovation management;

2 Such objects of the marketing concept as 'consumer' and 'communication' (Figure 4) create prerequisites for the development and implementation of the business process 'promotion'. That is why the 'four Ps variables' of marketing complex includes the variable 'communications' instead of the variable 'promotion', which, unlike other variables, is the business process. The 'product' management object requires the execution of the 'product management' business process. The 'price' management object serves as the basis for the formation and use of the 'pricing' business process. The 'place' management object determines the creation of 'physical distribution' business process as basis for the transition to the 'logistics management' business process. Thus, main business processes of the marketing concept are the business processes 'promotion', 'product management', 'pricing' and 'physical distribution'. The rest of business processes are related to certain time and serve as basis for the appearance of main variants of the marketing concept of type 'sustainable marketing' (e.g., Hunt, 2011) or 'Value-based Marketing' (e.g., Doyle, 2012).

3 Since the marketing concept is based on management concept, the business processes of both concepts are implemented jointly. At same time, the needs are formed in the market that can be met by products and (or) services for which the consumer places the order. In turn, the supplier sets the goal of 'making the profit', which involves the introduction of economically substantiated technologies that can perform the customer's order. As follows from the contents of Figure 6, the business processes 'product management' and 'technology management' are the basis for the execution of business process 'order fulfilment'.

The business processes presented in Figure 6 are performed by specific divisions of the enterprise as part of the chains, which will be discussed later.

During the transition of enterprises as chain links to the logistics concept, in accordance with the information in Figure 5, the objects of management and logistics concepts are changed and supplemented (Figure 7).

The contents analysis of Figure 7 allows make the following conclusions:

1 At certain stage of market development, the consumer does not so much pursue the goal of making the profit, but focuses on obtaining and creating value (AMA, 2017) that provides him with certain level of physical and spiritual well-being. The consumer's focus on value leads to the registration of demand for products and (or) services, which sometimes have to be created anew. In turn, the supplier shifts the focus from the goal of 'making the profit' to the goal of 'survival' (Drucker, 1958),

as the result of which this supplier assumes responsibility for fulfilling the customer's order with the involvement of capabilities of its suppliers;

2 The value of consumer makes significant adjustments to the concepts of management and marketing, on basis of which their variants are formed: Chain management and value management, respectively. At same time, as mentioned earlier, these variants form the third management concept 'logistics'.

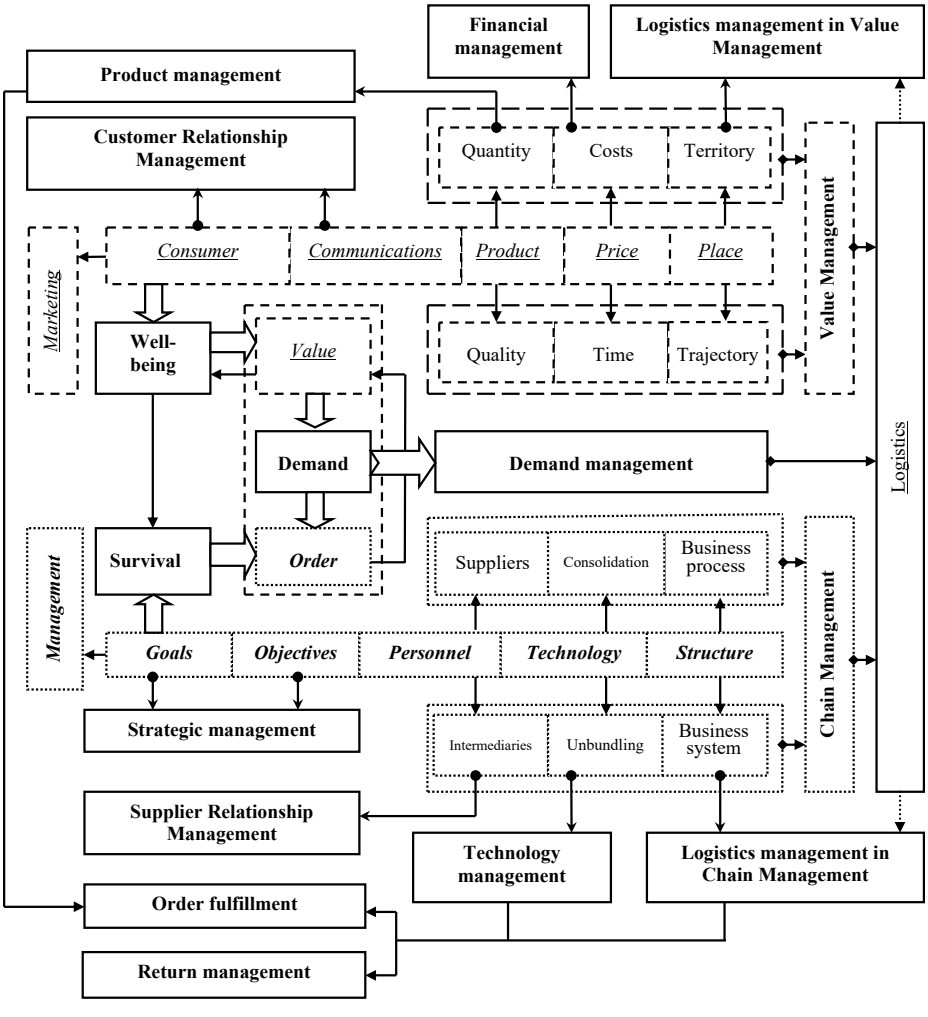
3 The 'product' management object is subject to wide differentiation and can be manufactured and assembled according to the 'quantity' and 'quality' objects, which requires modernisation of the 'product management' business process. The 'price' management object, together with the 'costs' and 'time' objects, transforms the 'pricing' business process into the 'financial management' business process. In other words, it is possible to increase the profit of the enterprise either by reducing costs, or by increasing the price for it by reducing the order fulfilment time. Due to the uniqueness of value, the business process 'promotion' is being developed and implemented as the business process 'customer relationship management'. The management object 'place' together with the objects 'territory' and 'trajectory' create prerequisites for the implementation of business process 'logistics management in value management', which performed in the external environment of enterprises. These business processes are implemented within the framework of value management as the variant of the logistics concept.

4 The formation of variant of logistics concept 'chain management' is performed using following business processes: 'strategic management' (objects 'goals' and 'objectives'); 'supplier relationship management' (objects 'personnel', 'suppliers' and 'intermediaries'), 'technology management', which it is focused on outsourcing and working with flows of single products (objects 'technology', 'consolidation' and 'unbundling'), 'logistics management in chain management' (objects 'structure', 'business process' and 'business system'). In addition, the business processes 'technology management', 'logistics management in chain management' and 'product management' form the business process 'order fulfilment' ('downstream' from supplier to consumer). If the 'product management' business process is removed from these three business processes, then the 'return management' business process is formed on the basis of the remaining business processes ('upstream': from the consumer to the supplier).

The information in Figure 7 allows offer definitions of the terms of variants of logistics concept as types of activity. According to the author,

- *Value management* is the type of enterprise activity that includes customer relationship management; product management and its commercialisation; financial management that takes into account the values of business system links; and logistics management that ensures the creation and delivery of value to end consumers.
- *Business systems (chain) management* is the type of enterprise activity that includes strategic management of these enterprises; supplier relationship management; as well as logistics management and technology management, which form the order fulfilment and return management to create and deliver value to end consumers.

Figure 7 Main business processes of logistics as the management concept



Source: Tyapukhin (2012)

4.4 Identification of divisions that perform business processes of enterprise management

The business processes shown in Figures 6 and 7 are performed by certain divisions of enterprises, which Table 2 helps to identify.

Table 2 Business processes of the main management concepts and divisions of enterprises that perform these business processes (on the example of an automobile industry enterprise)

Management concept	*Business process*	*Divisions of enterprise*
Management	Strategic management	Departments: strategic development, planning and economic
	Personnel management	Departments: personnel, labour and wages, advanced training and retraining, labour protection; security service
	Technology management	Workshops: procurement, forging and pressing, welding, machining, painting, assembly, auxiliary production (energy, repair, capital construction, packaging, etc.); production and dispatch department
Marketing	Promotion	Departments: advertising, public relations, personal selling, sales promotion
	Product management	Departments: product policy; design; cooperation with scientific organisations, patent offices, etc.; pre-production; pilot production
	Pricing	Pricing policy and pricing department
	Physical distribution	Transport shop, warehouse, forwarding service
Logistics	Customer relationship management	Departments: market research, consumer relationships, legal
	Financial management	Departments: finance, accounting, securities and investments
	Logistics management	Departments: research and design, external cooperation, dispatch
	Demand management	Departments: information technologies, acceptance and support of consumer orders
	Supplier relationship management	Departments: work with suppliers, requirement, administrative and household
	Return management	Departments: waste collection and sorting, claims handling; waste recycling and disposal shop

The contents analysis of the Table 2 allows make the following conclusions:

1 The business processes, regardless of the concept used by the enterprise, are usually performed not by one, but by several departments, and not only separately, but also in parallel. Therefore, when creating and delivering value to the end consumer of products and (or) services, it is advisable to use network planning methods of the PERT type (e.g., McKenna, 1980).

2 Using typical set of enterprise divisions, it is possible to form organisational management structures of various types. To solve this problem, it is advisable to use the following qualitative characteristics and dichotomies: ‘stability of business system’: stable, symbol ‘0’, and unstable, symbol ‘1’, as well as ‘stability of business process’: stable, symbol ‘0’, and unstable, symbol ‘1’ (Figure 8).

3 The design of organisational structure of management involves the structuring business processes into functions performed by structural enterprise units and into operations performed by executors in the workplace, and culminates in the development of regulations on divisions and job descriptions of enterprise personnel, which take into account the specific differences of the business processes, functions and operations performed by employees.

Figure 8 Variants of the internal environment of the enterprise and their corresponding organisational management structures

Stability of the business process	**Stability of the business system**	
	Stable (0)	Unstable (1)
Stable (0)	Functioning in the stable mode (00) (*bureaucratic management structure*)	Strategic or operational adaptation to the external environment (01) (*adaptive management structure*)
Unstable (1)	Diversification of the organization's activities (10) (*divisional management structure*)	Organizational flexibility (11) (*organic management structure*)

5 Discussion

The problem of successful activity of enterprises and chains is significantly complicated due to the complexity, uncertainty, transience of external and internal factors, as well as the variety of relations between these factors, which it is not possible to take into account in required volume at particular time. However, currently there are theoretical and methodological prerequisites for solving this problem with the help of information technologies, including digital twins of business systems and business processes. At same time, the structure of digital twins cannot contain management objects, which are described by vaguely formulated terms, have numerous variants and are presented in various combinations. The impact on these objects is accompanied by significant losses of lost profits, which, as a rule, is not recorded in management documentation. The only correct decision in these conditions is to use matrix approach to creating digital twins of business systems and business processes based on descriptive and facet methods of studying objects described mainly by qualitative characteristics. In addition, the matrix approach proposed by the author assumes the combination of system, process and situational approaches to managing complex objects. This article describes the content of systematic approach to the design of management objects, implemented according to the scheme: 'external environment → concept → management object → function (business process) → enterprise divisions (business system) → organisational management structure'.

The results obtained by the author can be refined and supplemented in following main aspects of research:

1 The discussion of variants for the basic concepts of enterprise management, depending on the stage of economic development and the sequence of their implementation, which, perhaps, is not linear, but cyclical.

2 The relations clarification of the logistics concept with the concepts of business systems (chain) management and value management. In this regard, it is advisable to obtain from specialists who believe that logistics (logistics management) is integral part of supply chain management logically constructed chain of evidence of the correctness of their points of view. This aspect of the discussion is particularly interesting, since there are the overwhelming majority of such specialists, and their ideas about the essence of logistics and supply chain management are mostly subjective.

3 The creation of the database concerning the description of factors of external and internal environment of business systems of various types with the allocation of relevant and irrelevant qualitative characteristics of management objects and dichotomies, allowing to identify their variants, as well as combinations at specific time.

4 The possibility of standardisation of main management objects both horizontally (within the framework of management concept) and vertically (within several related management concepts).

5 The development of structure of the prototype of universal digital twin of business systems and business processes, drawing up on its basis technical task for creating the instance of this twin (Grieves and Vickers, 2017), designed to significantly reduce the complexity of developing and implementing management decisions at the level of enterprises and chains.

6 Conclusions

The conducted research made it possible to obtain the following results that have signs of scientific novelty: the sequence of basic concepts of object management in business: management, marketing and logistics is justified; The main objects for managing these concepts are defined and relationships are established between them. definitions of interrelated terms ‘management’, ‘marketing’, ‘logistics’, ‘management of business systems (chains)’ and ‘value management’ are proposed; identified the main business processes performed within the framework of basic management concepts, as well as divisions of links of business systems (chains) responsible for their implementation; recommendations have been developed for the formation of an organisational structure for managing data links of business systems (chains).

In the future, the following research results are expected: the development of the concept of prototypes of digital twins of business systems and business processes used in the implementation of a particular management concept, as well as the digital twin of the management system that affects value creators for end consumers of products and (or) services, as well as justification of a systematic approach to the design of logistics management facilities, ranging from the concept of enterprise management used to the organisational structure of management.

Particular attention during the research is supposed to be paid to clarifying the essence and content of the matrix approach to the study of basic management objects, their options and combinations that allow designing and forming competitive business systems, business processes and management systems in conditions of complexity, uncertainty, transient factors of the external and internal environment.

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